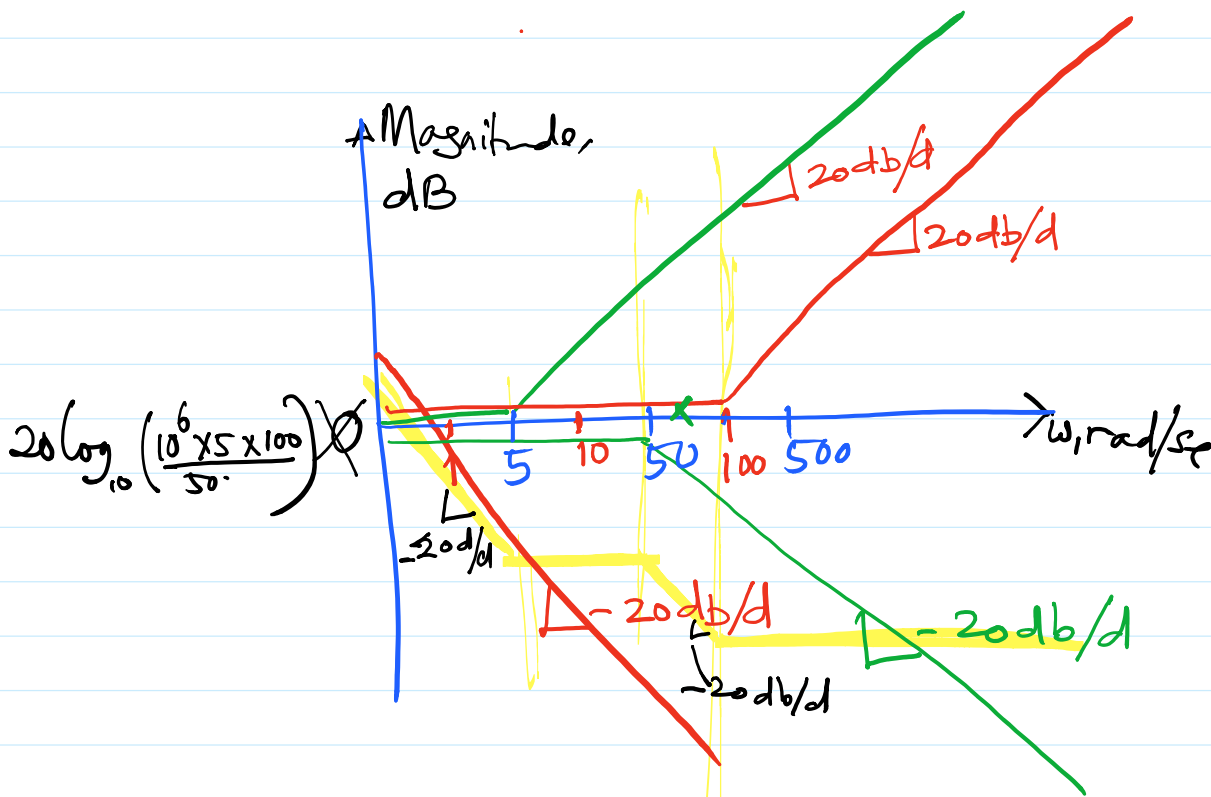Draw the Bode plot (Magnitude and phase of the following transfer function

$$T(s) = \frac{10^6(s+5)(s+100)}{s(s+50)}$$

$\omega = 60 \text{ rad/se}$

$20 \log_{10}\left(\frac{10^6 \times 5 \times 100}{50}\right)$

Magnitude, dB

20 db/d

20 db/d

-20 d/d

-20 db/d

-20 db/d

-20 db/d

$\omega, \text{rad/se}$

5   10   50   100   500

$20 \log_{10}\frac{1}{\omega}$

$\omega = 1$ $20 \log_{10} 1 = 0$

$\omega = 0.1$ $20 \log_{10}\frac{1}{0.1} = 20 \text{ dB}$

$\omega_q = 5$ 0.5

$W_q = 100$ 50   10

Plot labels:
- $\theta(-90+90°)$
- $-90°+\theta$
- $45°/d$ ... $45°/d$ (500)
- $-45°/d$
- $-90°$
- axis: ω, tick marks: 0.5, 5, 10, 50, 100, 1000

$w_{c_1} = 5$ → 50 → 10
$w_{c_2} = 100$ → 1000, 500
$w_{c_3} = 50$ → 5

$$T(s) = \frac{10^6 \; 5\left(1+\frac{s}{5}\right) 100\left(1+\frac{s}{100}\right)}{5\,50\left(1+\frac{s}{50}\right)}$$

$$\tan^{-1}\frac{\omega}{5} + \tan^{-1}\frac{\omega}{100} - 90 - \tan^{-1}\frac{\omega}{50} = \frac{10^6 \times 5 \times 100}{50} \times \frac{\left(1+\frac{s}{5}\right)\left(1+\frac{\cancel{s}}{\cancel{100}}\right)}{s\left(1+\frac{s}{50}\right)}$$

$$20\log_{10} = \left(\frac{10^6 \times 5 \times 100}{50} \times \frac{\frac{60}{5}}{60 \times \frac{60}{50}}\right)$$